

CLAIMS

Having thus described the invention, what is claimed is:

1. A machine tool installation for laser cutting of sheet metal workpieces comprising:
 - (a) a workpiece support having a multiplicity of parallel spaced grid elements providing the upper surface thereof;
 - (b) a machine frame having a generally vertical rear wall and an arm extending therefrom over said workpiece support, said grid elements of said workpiece support extending perpendicularly to said vertical wall of said machine frame;
 - (c) a laser cutting unit supported on said arm of said machine frame and including a laser cutting head, said cutting head being movable in X and Y axes over said workpiece support to cut parts from a sheet metal workpiece disposed thereon;

(d) an unloading unit for lifting the cut parts from said workpiece support and transporting them to a discharge station, said unloading unit having (i) a frame movably supporting (ii) a pair of opposed fork assemblies, (iii) a fork housing supporting said frame and enclosing (iv) a drive assembly for moving said fork assemblies between open and closed positions, said fork assemblies being spaced apart in the open position and having their opposed ends in adjacent relationship in the closed position, said unloading unit also having (iv) a support housing on which said fork housing is mounted for vertical movement, and (v) drive means for effecting vertical movement of said fork housing relative to said machine frame and said workpiece support, said unloading unit being movable between an operative position adjacent said workpiece support and the discharge station;

(e) drive means for moving said unloading unit between the operative position and discharge station; and

(f) a controller operable to (i) move said unloading unit between said discharge station and said operative position, (ii) move said fork assemblies into the open position, move said fork housing downwardly to position the fingers for movement into the spacing between said grid elements, (iii) move said fork assemblies into the closed position below the upper surface of said workpiece support, (iv) move said unloading unit upwardly to lift the cut parts and skeleton from said workpiece support, and (v) discharge the parts and skeleton on said unloading unit at the discharge station.

2. The machine tool installation in accordance with Claim 1 wherein said fork assemblies are comprised of a multiplicity of forks cooperatively dimensioned to move into the spacing between said grid elements and below the parts and skeleton on the upper surface of said grid elements.

3. The machine tool installation in accordance with Claim 2 wherein said forks are of generally C-shaped configuration.

4. The machine tool installation in accordance with Claim 1 wherein said drive assembly includes a motor and a chain drive connected to said fork assemblies.

5. The machine tool installation in accordance with Claim 1 wherein the parts and skeleton are deposited at the discharge station by moving said fork assemblies into the open position.

6. The machine tool installation in accordance with Claim 1 wherein said vertical rear wall of said frame has a multiplicity of recesses therein opening adjacent said workpiece support and into which one fork assembly is movable when the fork assemblies are moved into their open position, said open position enabling the fork assemblies to be moved downwardly on opposite sides of said workpiece support to a position in which the forks can move between the grid elements when the fork assemblies are moved into the closed position.

7. A machine tool installation for laser cutting of sheet workpieces

comprising:

- (a) a workpiece support having a multiplicity of parallel spaced grid elements providing the upper surface thereof;
- (b) a machine frame having a generally vertical rear wall and an arm extending therefrom over said workpiece support, said grid elements of said workpiece support extending perpendicularly to said vertical wall of said machine frame;
- (c) a laser cutting unit supported on said arm of said machine frame and including a laser cutting head, said cutting head being movable in X and Y axes over said workpiece support to cut parts from a sheet metal workpiece disposed thereon;
- (d) an unloading unit for lifting the cut parts from said workpiece support and transporting them to a discharge station, said unloading unit having (i) a frame movably supporting (ii) a pair of opposed fork assemblies, said fork assemblies being comprised of a multiplicity of forks of generally C-Shaped configuration and cooperatively dimensioned to move into the spacing between said grid elements and below the parts and skeleton on the upper surface of said elements, (iii) a fork housing supporting said frame and enclosing (iv) a drive assembly for moving said fork assemblies between open and closed positions, said fork assemblies being spaced apart in the open

position and having their opposed ends in adjacent relationship in the closed position, said unloading unit also having (iv) a support housing on which said fork housing is mounted for vertical movement, and (v) drive means for effecting vertical movement of said fork housing relative to said machine frame and said workpiece support, said unloading unit being movable between an operative position adjacent said workpiece support and the discharge station;

(e) drive means for moving said unloading unit between the operative position and discharge station; and

(f) a controller operable to (i) move the unloading unit between said discharge station and said operative position (ii) move said fork assemblies into the open position and the fork housing downwardly to position the fingers for movement into the spacing between the grid elements, (iii) move said fork assemblies into the closed position below the upper surface of said workpiece support, (iv) move said unloading unit upwardly to lift the cut parts and skeleton from said workpiece support, and (v) discharge the parts and skeleton on said unloading unit at the discharge station.

8. The machine tool installation in accordance with Claim 7 wherein said drive assembly includes a motor and a chain drive connected to said fork assemblies.

9. The machine tool installation in accordance with Claim 7 wherein the parts and skeleton are deposited at the discharge station by moving said fork assemblies into the open position.

10. A machine tool installation for laser cutting of sheet workpieces comprising:
- (a) a workpiece support having a multiplicity of parallel spaced grid elements providing the upper surface thereof;
 - (b) a machine frame having a generally vertical rear wall and an arm extending therefrom over said workpiece support, said grid elements of said workpiece support extending perpendicularly to said vertical wall of said machine frame, said vertical rear wall of said frame has a multiplicity of recesses therein opening adjacent said workpiece support;
 - (c) a laser cutting unit supported on said arm of said machine frame and including a laser cutting head, said cutting head being movable in X and Y axes over said workpiece support to cut parts from a sheet metal workpiece disposed thereon;
 - (d) an unloading unit for lifting the cut parts from said workpiece support and transporting them to a discharge station, said unloading unit having (i) a frame movably supporting (ii) a pair of opposed fork assemblies, (iii) a fork housing supporting said frame and enclosing (iv) a drive assembly for moving said fork assemblies between open and closed positions, said fork assemblies being spaced apart in the open position and having their opposed ends in adjacent relationship in the closed position, said unloading unit also having (iv) a support housing on which said fork housing is mounted for vertical movement, and (v) drive means for effecting vertical movement of said

fork housing relative to said machine frame and said workpiece support, said unloading unit being movable between an operative position adjacent said workpiece support and the discharge station, one fork assembly being movable into said recesses in said frame rear wall when the fork assemblies are moved into their open position to enable the fork assemblies to be moved downwardly on opposite sides of said workpiece support to a position in which the forks can move between the grid elements when the fork assemblies are moved into the closed position, said fork assemblies are comprised of a multiplicity of forks cooperatively dimensioned to move into the spacing between said grid elements and below the parts and skeleton on the upper surface of said grid elements, and said forks are of generally C-shaped configuration;

(e) drive means for moving said unloading unit between the operative position and discharge station; and

(f) a controller operable to (i) move the unloading unit between said discharge station and said operative position (ii) move said fork assemblies into the open position and the fork housing downwardly to position the fingers for movement into the spacing between the grid elements, (iii) move said fork assemblies into the closed position below the upper surface of said workpiece support, (iv) move said unloading unit upwardly to lift the cut parts and skeleton from said workpiece support, and (v) discharge the parts and skeleton on said unloading unit at the discharge station.

11. The machine tool installation in accordance with Claim 10 wherein said drive assembly includes a motor and a chain drive connected to said fork assemblies.

12. The machine tool installation in accordance with Claim 10 wherein the parts and skeleton are deposited at the discharge station by moving said fork assemblies into the open position.